

Semiconductors, Printed Circuit Boards, Other Electronic Components: 2001

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SUMMARY OF FINDINGS

During 2001, the total value of shipments of semiconductors, printed circuit boards, and other electronic components was \$117,564.9

million. This represents a 28.7-percent decrease from the revised 2000 total of \$164,853.6 million. The 2001 data include electron tubes and parts, \$2,978.1 million, a decrease of 30.8 percent from 2000; printed circuit boards, \$8,944.9 million, a decrease of 24.8 percent from 2000; semiconductors and related devices, \$55,149.2 million, a decrease of 35.6 percent over the revised total from 2000. Capacitors decreased 31.2 percent to \$1,917.3 million; resistors decreased by 27.4 percent to \$712.9 million; coils and transformers had a 26.7-percent decrease to \$1,259.8 million; electronic connectors was \$4,627.0 million in 2001, compared to \$5,931.7 million in 2000, a decrease of 22.0 percent; and other electronic components decreased to \$41,975.7 million, from a revised 2000 total of \$51,629.0 million, a decrease of 18.7 percent.

For general CIR information, explanation of general terms and historical note, see the appendix.

Address inquiries concerning these data to Investment Goods Industries Branch, Manufacturing and Construction Division (MCD), Washington, DC 20233-6900, or call Philippe S.J. Morris, 301-457-4819.

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Table 1. Value of Shipments of Semiconductors, Printed Circuit Boards, and Other Electronic Components by Class of Product: 1996 to 2001
[Value in million of dollars]

Product code	Product description	2001	2000	1999	1998	1997	1996
3344111	Transmittal, industrial, and special-purpose electron tubes (except X-ray).....	654.0	702.8	672.9	629.5	655.9	611.4
3344114	Receiving type electron tubes and cathode ray picture tubes.....	2,226.3	3,457.5	3,578.5	3,367.1	3,433.6	3,272.0
3344117	Electron tube parts.....	97.8	143.5	136.4	146.6	161.0	153.1
3344120	Printed circuit boards.....	8,944.9	11,891.8	9,149.9	8,473.2	8,702.4	8,216.8
3344131	Integrated microcircuits (semiconductor networks).....	47,119.2	73,663.7	62,868.4	57,643.5	57,019.4	52,639.3
3344134	Transistors.....	785.9	1,569.3	993.7	887.0	1,500.2	945.9
3344137	Diodes and rectifiers.....	398.4	620.6	1,038.3	907.6	1,190.5	861.4
334413A	Other semiconductor devices.....	6,845.6	9,757.0	11,745.4	11,055.8	10,262.3	10,976.1
3344140	Capacitors for electronic applications.....	1,917.3	2,786.1	2,035.1	1,946.9	2,098.7	1,653.4
3344150	Resistors.....	712.9	981.7	970.6	944.6	993.4	911.9
3344160	Coils, transformers, reactors, and chokes for electronic applications.....	1,259.8	1,718.8	1,422.5	1,368.3	1,425.7	1,435.6
3344171	Coaxial connectors.....	505.2	805.0	630.5	590.3	581.0	656.9
3344174	Cylindrical connectors.....	661.6	725.3	549.5	579.5	554.9	642.5
3344177	Rack and panel connectors.....	350.8	531.7	391.4	745.6	657.9	530.7
334417A	Printed circuit connectors.....	1,064.8	1,810.8	1,375.8	1,124.8	1,276.5	1,095.3
334417D	Other connectors, including parts.....	2,044.6	2,058.9	2,041.2	1,973.1	2,208.8	1,617.1
3344191	Filters (except microwave) and piezoelectric devices.....	941.2	1,167.9	857.5	797.5	814.7	719.3
3342207	Microwave components and devices.....	1,510.5	2,435.1	1,621.6	1,580.7	1,439.8	1,251.4
3344194	Transducers, electrical/electronic input or output.....	1,437.6	1,519.3	1,330.7	1,372.7	1,219.6	1,104.8
3344197	Switches, mechanical types for electronic circuitry.....	774.0	902.6	883.4	882.5	791.2	738.0
334418A	Printed circuit assemblies.....	30,712.9	37,272.5	30,090.9	26,046.5	27,040.2	24,937.3
334419D	All other electronic components, n.e.c.	6,599.5	8,331.6	7,275.7	7,322.4	7,484.7	7,199.1

n.e.c. Not elsewhere classified.

Table 2. Quantity and Value of Shipments of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2001 and 2000
[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2001		2000	
			Quantity	Value	Quantity	Value
334411	Electron tubes.....	(NA)	(X)	2,978,123	(X)	4,303,752
3344111	Transmittal, industrial, and special-purpose electron tubes (except X-ray).....	31	(X)	654,023	(X)	702,797
3344111105	Power and special-purpose tubes: High vacuum tubes, including triodes, multigrid external and internal anodes, diodes, and other.....	6	76	68,881	85	69,282
3344111110	Gas and vapor tubes, including ignitron, gas duplexers, spark gaps, and other.....	9	668	33,085	648	31,796
3344111115	Klystrons, including amplifier, reflex, and other.....	5	(D)	(D)	298	55,274
3344111120	Magnetrons, including pulsed, fixed, tunable, cross-field, continuous wave, and other.....	4	(D)	(D)	17	43,729
3344111222	Traveling wave tubes (TWT): Forward wave: Continuous wave (CW).....	4	3,518	105,727	r/ 3,013	r/ 89,600
3344111232	Pulsed power.....	5	1,206	84,856	r/ 1,150	r/ 90,033
3344111265	Backward wave	-	-	-	-	-
3344111340	Light sensing tubes.....	7	80	98,333	95	103,832
3344111360	Light emitting devices, including storage tubes all sizes, cathode ray tubes, color and monochrome (industrial and military), special display devices, including alphanumeric readout tubes, figure indicating tubes, and other.....	8	205	59,107	1,564	118,006
3344111370	Miscellaneous special-purpose tubes (reference cavities, radiation detection (geiger, neutron counters, etc.), beam deflection, decade counters, orbital beam, vacuum gauges, vacuum capacitors, switches, relays, etc.	8	(X)	106,664	(X)	101,245
3344114	Receiving type electron tubes and cathode ray picture tubes.....	(NA)	(X)	2,226,278	(X)	3,457,465
3344114005	Receiving type electron tubes, all types, including rebuilt	1	(D)	(D)	(D)	(D)
3344114010	Television tubes, including any defective tube that has been rebuilt: Color having a video display diagonal of: 50 cm and under (20 inches and under) 1/.....	5	(D)	(D)	(D)	(D)
3344114015	Over 50 cm, but not exceeding 63 cm (21 through 25 inches) 1/.....	1	11,369	670,982	16,822	1,211,165
3344114020	Exceeding 63 cm (26 inches and over).....	6	10,634	1,459,506	r/ 14,246	r/ 2,172,259
3344114025	Other, including rebuilt color and new and rebuilt black and white.....	5	(D)	(D)	(D)	(D)
3344117030	Electron tube parts (except glass blanks): bases, getters, cathodes, headers, guns.....	16	(X)	97,822	(X)	143,490
334412	Printed-circuit (wiring) boards.....	520	(X)	8,944,884	(X)	11,891,839
3344120105	Single-sided glass printed.....	253	(X)	222,764	(X) r/	285,240
3344120210	Double-sided glass printed.....	344	(X)	1,055,599	(X) r/	1,417,667
3344120315	Multilayer glass printed.....	337	(X)	5,056,997	(X) r/	6,647,974
3344120420	Single-sided flex printed.....	46	(X)	404,162	(X) r/	609,519
3344120425	Double-sided flex printed.....	43	(X)	113,163	(X) r/	179,543
3344120430	Multilayer flex and rigid/flex printed.....	52	(X)	224,123	(X) r/	224,918
3344120432	Back-bared flex printed boards.....	-	(X)	-	(X)	-
3344120433	Sculptured flex printed boards.....	-	(X)	-	(X)	-
3344120435	All paper/mat/composite printed boards.....	12	(X)	15,068	(X) r/	29,442
3344120440	Other substitute printed boards.....	64	(X)	1,256,442	(X) r/	1,634,685
3344120545	Receipts for contract work on printed circuit boards (etching, dip-soldering, imprinting, etc.), but not printed board assembly.....	64	(X)	596,566	(X) r/	862,851
334413	Semiconductors and related devices.....	(NA)	(X)	55,149,199	(X)	85,610,702
3344131	Monolithic integrated circuits.....	195	16,183,318	47,119,219	22,031,952	73,663,688
3344131036	Monolithic integrated circuits, digital, nonsilicon (e.g., gallium arsenide): Memory	4	(D)	(D)	(D)	(D)
3344131048	Logic and other.....	10	134,047	645,380	r/ 234,132	r/ 1,119,558
3344131015	Monolithic integrated circuits, digital, silicon: Bipolar transistors, memory: Static read-write random access (SRAM) 2/.....	6	(D)	(D)	(D)	(D)
3344131021	Other memory 2/.....	4	13,309	79,664	5,853	9,198
3344131024	Other bipolar transistors, including logic: Transistor-transistor logic (TTL).....	13	149,069	542,191	232,553	238,148
3344131032	Other, including emitter couple logic (ECL).....	9	(D)	(D)	(D)	(D)
3344131068	Metal oxide semiconductor (MOS) field effect transistors: Volatile memory DRAMS (dynamic read-write random access): Not over 3 MB 3/.....	5	(D)	(D)	(D)	(D)

Table 2. Quantity and Value of Shipments of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2001 and 2000
[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2001		2000	
			Quantity	Value	Quantity	Value
3344131070	Over 3 MB but not over 15 MB 3/.....	5	5,212	11,272	85,636	548,666
3344131072	Over 15 MB.....	9	738,783	2,268,498	(D)	(D)
	Volatile memory SRAMS (static read-write random access):					
3344131082	Not over 40 k 4/.....	3	(D)	(D)	121,295	r/ 153,865
3344131084	Over 40 k but not over 80 k 4/.....	4	36,316	57,338	31,121	r/ 74,658
3344131086	Over 80 k	17	145,790	1,080,849	270,279	1,668,550
	Nonvolatile EEPROMs (electrically erasable programable read-only memory):					
3344131092	Not over 80 k 5/.....	9	(D)	(D)	(D)	(D)
3344131094	Over 80 k 5/.....	9	948,113	1,069,118	1,370,756	1,044,234
3344131079	Nonvolatile EPROMs (erasable, except electrically, programable read-only memory).....	11	150,853	416,318	r/ 224,072	r/ 628,830
3344131080	Other nonvolatile memory.....	11	632,351	2,995,598	r/ 863,946	r/ 4,682,480
	Other, including microprocessors, controllers, application specific integrated circuits (ASICs), and programable logic arrays (PLAs):					
3344131054	Microprocessors having an internal data bus of 8 bits or less.....	14	734,320	718,708	1,220,798	990,577
3344131057	Microprocessors having an internal data bus of 16 bits.....	11	120,596	1,027,624	190,694	1,370,425
3344131060	Microprocessors having an internal data bus of 32 bits or more.....	18	(D)	(D)	(D)	(D)
3344131033	Other (microcontrollers, ASICs, PLAs, etc.).....	31	1,208,759	6,150,468	r/ 1,846,487	9,377,869
	Other digital, silicon, including bipolar combined with MOS:					
3344131039	Complementary BiMOS (BiCMOS).....	6	3,080,761	894,149	(D)	(D)
3344131042	Other complementary BiMOS (BiCMOS), including logic.....	15	333,822	445,301	r/ 1,137,224	r/ 833,186
3344131045	Other digital silicon ICs.....	19	1,064,855	1,708,911	3,048,557	2,901,202
	Nondigital silicon monolithic integrated circuits (e.g., linear, analog):					
3344131062	Radio frequency.....	7	136,527	306,150	(D)	(D)
3344131003	Other, analog.....	27	2,174,523	1,907,136	r/ 3,038,257	3,148,169
3344131006	Other, including mixed signal (analog and digital), logic.....	16	485,001	977,462	542,893	1,012,248
3344131009	Other, including mixed signal (analog and digital), other.....	20	721,358	2,460,440	r/ 893,574	r/ 3,621,532
	Hybrid integrated circuits:					
3344131018	Radio frequency.....	24	282,995	654,320	367,571	340,083
3344131051	Other.....	48	153,898	756,194	r/ 227,336	r/ 860,846
3344131012	Other.....	50	702,146	2,616,017	r/ 937,907	r/ 3,521,134
3344134	Transistors.....	32	(X)	785,912	(X)	1,569,335
3344134005	Signal (less than 1 watt dissipation)	16	(X)	50,892	(X)	(D)
3344134010	Power (1 watt or greater dissipation)	28	(X)	735,020	(X)	r/ 1,569,335
3344137	Diodes and rectifiers.....	49	363,209	398,449	490,887	620,644
3344137010	Signal diodes and assemblies thereof (maximum current 0.5 amps).....	17	20,885	11,165	31,752	15,164
3344137015	Semiconductor rectifiers/power diodes and assemblies thereof (current rating greater than 0.5 amps).....	31	142,985	161,597	147,634	149,191
3344137025	Zener diodes (voltage regulator and voltage reference diodes) 6/.....	21	(D)	(D)	(D)	(D)
3344137005	Selenium rectifiers 6/.....	4	109,583	87,877	137,680	73,403
3344137020	Microwave diodes (mixers, detectors, varactors, parametric, harmonic generators, etc.).....	10	89,756	137,810	173,821	382,886
334413A	Other semiconductor devices.....	176	(X)	6,845,619	(X)	9,757,035
	Light-sensitive and light-emitting devices:					
334413A005	Solar cells.....	16	(X)	122,069	(X)	123,792
334413A010	Photovoltaic modules.....	13	(X)	142,794	(X)	122,818
	Light-emitting diodes (LEDs):					
334413A015	Discrete, infrared and laser.....	21	(X)	390,152	(X)	r/ 291,499
334413A020	Alpha or numeric displays.....	7	(X)	(D)	(X)	(D)
334413A025	Photodiodes, including infrared detectors.....	19	(X)	205,421	(X)	r/ 210,916
334413A030	Optical coupled isolators, including sensors and emitters.....	6	(X)	(D)	(X)	(D)
334413A035	Other light sensitive and light-emitting devices, including photovoltaic devices and photoelectric-magnetic devices.....	13	(X)	241,845	(X)	r/ 416,626
	Other semiconductor devices:					
334413A040	Thyristors (SCRs, triacs, PNP diodes).....	7	(X)	96,235	(X)	(D)
334413A050	All other semiconductor devices (tunnel diodes, thermoelectric semiconductor junctions, metal-oxide varistors, solidstate transducers, and special semiconductor devices, n.e.c.).....	16	(X)	671,743	(X)	(D)

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[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2001		2000	
			Quantity	Value	Quantity	Value
	Semiconductor parts:					
	Chips and wafers:					
334413A055	For integrated circuits (IC's).....	39	(X)	3,278,985	(X) r/	4,406,006
334413A060	For discrete semiconductors.....	36	(X)	270,284	(X) r/	465,285
334413A065	All other semiconductor parts (headers, packages, heat sinks, other accessories, etc.).....	48	(X)	1,342,049	(X) r/	1,543,373
334414	Capacitors.....	99	(X)	1,917,334	(X)	2,786,102
	Paper, plastic (film), metalized, and dual (film/paper) dielectric capacitors, fixed:					
	AC types:					
3344140103	Less than 300 volts.....	18	16,355	28,623	18,118	34,662
3344140106	300 volts to 599 volts.....	19	36,243	74,232	43,013	80,150
3344140109	600 volts to 999 volts.....	14	2,955	6,487	4,923	11,937
3344140112	1,000 volts or over.....	11	1,054	8,920	1,054	10,459
	Capacitors having a reactive power handling capacity of 0.5 kVAR or less:					
	Dc types/other:					
3344140215	Axial lead.....	20	23,134	39,306	39,762	46,846
3344140218	Radial lead.....	9	38,410	16,644	69,162	29,758
3344140221	Chips and other leaded devices.....	1	(D)	(D)	(D)	(D)
3344140331	Tantalum electrolytic 7/.....	11	(D)	(D)	(D)	(D)
3344140333	Other leaded (molded axial and molded radial) 7/.....	2	329,158	178,887	1,671,087	430,441
	Aluminum electrolytic:					
3344140436	Less than 18 mm through 35 mm	5	(D)	(D)	(D)	(D)
3344140439	Small can style (over 35mm through 51 mm)	5	707	2,715	628	3,192
3344140442	Other can style (over 51 mm)	6	9,974	70,112	10,867	69,327
3344140445	Ac motor start	1	(D)	(D)	(D)	(D)
3344140550	Ceramic dielectric, single layer.....	8	105,133	16,894	175,353	24,677
	Ceramic dielectric, multilayer:					
3344140555	Axial leads and radial leads.....	10	89,422	49,383	4,582,874	184,604
3344140560	Chips.....	19	33,674,799	593,170	60,307,577	927,096
	Other:					
3344140663	Mica dielectric.....	8	10,127	8,478	10,635	8,937
3344140666	All other fixed.....	20	130,953	87,021	240,252	109,913
	Variable:					
3344140769	Mica, ceramic or glass dielectric 8/.....	5	(D)	(D)	(D)	(D)
3344140772	Other 8/.....	6	20,142	45,065	21,446	47,339
3344140875	Parts of capacitors, including unfinished chips for further finishing and assembly.....	13	(X)	(D)	(X) r/	663,770
334415	Resistors.....	93	(X)	712,861	(X)	981,667
3344150104	Fixed carbon resistors, composition or film types.....	11	39,287	14,751	49,876	18,983
	Other fixed resistors (power capacity 20W or less):					
	Surface mounted, having two terminals:					
3344150208	Flat resistor chips 9/.....	22	(D)	(D)	459,642	82,160
3344150212	Cylindrical leadless resistors, including metal film, metal oxide, and thick cermet film 9/.....	7	385,551	81,485	(D)	(D)
	Surface mounted, having more than two terminals (resistor networks):					
3344150216	Dual-in-line package.....	7	84,774	23,517	180,243	44,674
3344150220	Other, including flat packs.....	10	4,259	6,978	13,384	14,458
	Resistors, having two leads:					
3344150224	Wirewound.....	21	73,177	62,201	109,295	74,832
3344150228	Other, including metal film, metal oxide, and thick cermet film.....	17	347,980	72,329	558,980	100,650
	Resistor networks, having more than two leads:					
3344150232	Single-in-line.....	17	54,233	32,930	108,342	47,398
3344150236	Dual-in-line.....	8	17,525	5,942	30,782	11,284
3344150240	Other.....	11	58,306	50,427	67,650	65,627
	Variable, nonwirewound:					
	Trimmers:					
3344150344	Single-turn, carbon and other film 10/.....	5	(D)	(D)	(D)	(D)
3344150348	Multiturn, carbon and other film 10/.....	4	9,701	13,179	12,654	21,036
3344150359	Potentiometers, precision and panel type.....	12	18,905	96,577	16,560	82,855
	Variable, wirewound:					
3344150468	Variable wirewound (except potentiometers), including nonprecision and trimmers 11/.....	2	(D)	(D)	(D)	(D)
3344150469	Potentiometers, precision and panel type 11/.....	11	5,827	21,990	2,186	23,794
	Miscellaneous:					
3344150576	Varistors.....	7	(D)	(D)	(D)	(D)
3344150580	Thermistors, bead type, disc, rod.....	13	(D)	(D)	469,363	131,748
3344150684	Parts for resistors.....	9	(X)	114,153	(X) r/	161,687
334416	Coils, transformers, reactors, and chokes for electronic applications.....	241	(X)	1,259,841	(X)	1,718,769
3344160020	Audio frequency (AF) transformers.....	78	19,954	76,524	65,608	145,433
3344160025	Low frequency (LF) chokes.....	91	16,494	67,574	26,799	108,687

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[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2001		2000	
			Quantity	Value	Quantity	Value
3344160030	Plate and filament transformers, including autotransformers (except toroidal).....	59	11,920	110,672	13,192	132,677
3344160035	Pulse transformers, computer, and other types.....	83	41,930	124,065	45,730	160,647
3344160005	Radio frequency (RF) chokes.....	37	39,735	28,216	61,237	43,714
3344160010	Radio frequency (RF) coils.....	40	159,060	78,818	221,488	108,186
3344160015	Intermediate frequency (IF) transformers.....	40	35,265	73,193	76,021	123,316
3344160040	Television transformers and reactors (horizontal output, vertical deflection, focus coils, deflection yokes, etc.).....	21	15,724	118,918	18,818	171,408
3344160045	Toroidal windings (transformers and reactors) (except complete magnetics amplifiers).....	111	269,380	175,234	188,416	239,636
3344160050	Other (balun coils, permeability tuning devices, etc.).....	92	(X)	406,627	(X)	485,065
334417	Electronic connectors.....	(NA)	(X)	4,626,981	(X)	5,931,670
3344171	Coaxial (RF) connectors.....	54	587,645	505,240	929,437	804,981
3344171005	Miniature (BNC, PNC, MHB).....	25	101,284	82,910	r/ 112,938	149,847
3344171010	Subminiature (SMA, SMB, SMC).....	31	118,360	130,860	104,605	r/ 166,314
3344171015	Other standard and precision.....	44	368,001	291,470	711,894	488,820
3344174	Cylindrical connectors.....	48	209,444	661,608	268,911	725,323
3344174005	Heavy duty and standard.....	35	167,865	421,377	r/ 216,120	r/ 453,449
3344174010	Miniature.....	17	13,713	84,700	17,217	103,812
3344174015	Subminiature.....	16	27,866	155,531	r/ 35,574	r/ 168,062
3344177	Rack and panel (rectangular) connectors.....	46	1,005,372	350,753	1,226,980	531,659
3344177005	Integral shell, Mil-C-22857 (8434) and similar types.....	27	555,053	134,961	r/ 520,513	r/ 146,928
	Subminiature:					
3344177010	Ribbon, including planar cable type 12/.....	7	(D)	(D)	(D)	(D)
3344177015	D-Subminiature, including planar cable type 12/.....	18	431,212	143,224	680,834	295,798
3344177020	Microminiatures.....	13	19,107	72,568	r/ 25,633	r/ 88,933
334417A	Printed circuit connectors.....	63	4,243,053	1,064,806	4,810,835	1,810,796
334417A005	Card insertion types.....	35	173,085	100,801	r/ 260,239	r/ 159,191
	Two-piece types:					
334417A010	Post, header and receptacle type.....	38	3,609,729	441,456	3,804,326	786,073
334417A015	Other two-piece types.....	33	460,239	522,549	r/ 746,270	r/ 865,532
334417D	Other connectors, including parts.....	111	(X)	2,044,574	(X)	2,058,911
334417D005	Hermetic sealed (except single-contact and coaxial types).....	23	211,663	164,702	212,002	172,999
334417D010	Plate module types.....	6	(D)	(D)	10,022	36,875
334417D015	Fiber optic connectors.....	15	114,147	657,030	(D)	(D)
334417D030	Other planar cable (flat conductor or ribbon cable), excluding rack and panel (rectangular types).....	28	(D)	(D)	349,128	477,708
334417D020	Miscellaneous special purpose.....	69	1,500,974	981,067	2,192,108	1,187,441
334417D025	Parts for connectors (connectors shipped but still requiring further manufacture).....	24	(X)	120,227	(X)	r/ 183,888
334419	Electronic components and subassemblies, n.e.c.	(NA)	(X)	41,975,586	(X)	51,629,018
3344191	Filters (except microwave) and piezoelectric devices.....	118	311,160	941,177	379,037	1,167,880
33441911	Filters (except microwave).....	(NA)	127,262	296,639	177,349	357,147
3344191105	Mechanical, excluding optical lenses (germanium silicon, fused quartz, rock salt, and other).....	7	615	37,614	677	45,211
	Radio frequency interference/electro magnetic interference (RFI/EMI) control filters:					
3344191110	Ceramic dielectric.....	14	47,298	95,589	145,478	151,104
3344191115	Combination or other dielectric.....	17	76,308	128,830	r/ 27,515	r/ 115,379
3344191120	Electronic wave filters (LC band and high pass).....	20	3,041	34,606	r/ 3,679	r/ 45,453
33441912	Piezoelectric devices.....	(NA)	183,898	644,538	201,688	810,733
	Oscillator crystals:					
3344191225	AT-cut.....	27	3,173	32,058	10,338	51,987
3344191230	Other.....	9	51,258	69,100	52,471	66,114
	Crystal oscillators:					
3344191235	Oven.....	8	271	42,421	360	43,625
3344191240	TCXO/VCXO.....	13	4,222	76,317	2,308	40,107
3344191245	Hybrid.....	14	4,762	56,538	9,263	69,892
3344191250	Other.....	9	4,576	74,537	r/ 4,911	r/ 70,851
	Crystal filters:					
3344191255	Monolithic, including filter crystals and/or monolithic filter units not assembled into filters 13/.....	5	(D)	(D)	691	9,054
3344191260	Packaged AT-cut, including monolithic, tandem monolithic, and resonator filter assemblies 13/.....	5	573	13,159	71	2,569
3344191265	Other.....	9	80,374	77,089	76,111	128,259
	Crystal blanks:					
3344191270	AT-cut.....	8	4,747	10,754	5,863	11,471
3344191275	Other.....	18	29,942	192,565	r/ 39,301	r/ 316,804
3342207	Microwave components and devices (except antenna), tubes, and semiconductors.....	121	(X)	1,510,493	(X)	2,435,128
3342207005	Ferrite, including yttrium garnets, microwave components (circulators, isolators, phase shifters, attenuators, equalizers, limiters, mixers, etc.).....	37	(X)	355,237	(X)	1,073,373

Table 2. Quantity and Value of Shipments of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2001 and 2000
[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2001		2000	
			Quantity	Value	Quantity	Value
	Microwave devices, other than ferrite and solid state:					
3342207010	Attenuators (dummy loads, high- and low-power terminations, etc.).....	36	(X)	136,097	(X) r/	165,223
3342207015	Cavities (amplifier cavities, coaxial tuned cavities, etc.).....	16	(X)	59,488	(X)	51,946
3342207020	Couplers (directional couplers, hybrid junctions, etc.).....	28	(X)	57,571	(X)	62,164
3342207025	Reactive microwave components, n.e.c.	36	(X)	225,175	(X) r/	271,518
3342207030	Switches, coaxial and waveguide.....	31	(X)	84,942	(X) r/	78,891
3342207035	Rigid waveguide and fittings (bend and twists, couplings, flanges, other simple waveguide components, n.e.c.).....	20	(X)	62,157	(X)	54,705
3342207040	Flexible waveguides and fittings.....	13	(X)	35,747	(X)	50,108
3342207045	Other microwave components (except ferrite devices) (coaxial to waveguide and other transitions, duplexers and diplexers, holders and mounts, linear and circular polarizers, magnetron test plumbing, rotary joints and sector scan joints, mixer arrays, shutters, tuners, windows, etc.).....	37	(X)	263,804	(X)	291,422
3342207050	Microwave subassemblies, including parametric amplifiers and other solid-state assemblies.....	24	(X)	230,275	(X) r/	335,778
3344194	Transducers, electrical/electronic I/O, n.e.c.	90	168,248	1,437,570	152,739	1,519,270
3344194005	Electroacoustic (sonar, ultrasonic, vibration*, etc.).....	15	35,348	152,654	19,619	127,259
	Electromechanical:					
3344194010	Accelerometers*.....	11	11,005	179,690	5,781	177,424
3344194015	Pressure*.....	38	65,335	550,598	62,266 r/	580,968
3344194020	Strain gauges and other mechanical*.....	22	1,711	125,450	1,871	156,405
3344194025	Thermoelectric (pyrometers, thermocouples*, etc.).....	8	2,712	64,950	2,772	65,901
3344194030	Other (optical, chemical, magnetic, nuclear*, etc.).....	25	52,137	364,228	r/ 60,430 r/	411,313
3344197	Switches, mechanical types for electronic circuitry.....	78	(X)	774,000	(X)	902,575
3344197020	Slide, including rocker, miniature and subminiature*.....	12	(X)	34,510	(X) r/	47,001
3344197025	Rotary selector, including lever and jog-lever, miniature and subminiature*.....	17	(X)	57,942	(X)	65,107
3344197030	Keyboard*.....	10	(X)	(D)	(X) r/	55,746
3344197035	Pushbutton*.....	22	(X)	66,022	(X) r/	95,201
3344197040	Snap-action*.....	12	(X)	39,272	(X) r/	47,999
3344197045	Thumbwheel*.....	3	(X)	(D)	(X) r/	10,717
3344197015	Membrane.....	17	(X)	95,745	(X) r/	110,753
3344197005	Toggle standard type 14/.....	8	(X)	(D)	(X)	(D)
3344197010	Toggle miniature and subminiature 14/.....	6	(X)	45,294	(X)	57,011
3344197050	DIP.....	8	(X)	(D)	(X)	54,782
3344197055	Other.....	39	(X)	358,112	(X) r/	358,258
334418A	Printed circuit assemblies (loaded boards, subassemblies and modules) 15/.....	758	(X)	30,712,895	(X)	37,272,519
334418A005	Computer and peripheral printed board assemblies 15/.....	265	(X)	11,170,750	(X) r/	14,189,451
334418A010	Communications printed board assemblies 15/.....	252	(X)	9,094,359	(X) r/	10,880,133
334418A015	Industrial process control board assemblies 15/.....	219	(X)	1,115,058	(X) r/	1,132,385
334418A020	Instrumentation printed board assemblies (except industrial process) 15/.....	189	(X)	2,181,651	(X) r/	2,458,563
334418A025	Search and detection printed board assemblies 15/.....	55	(X)	100,768	(X)	103,980
334418A030	Consumer electronics, printed board assemblies 15/.....	137	(X)	556,420	(X) r/	578,641
334418A035	Other electronics, printed board assemblies, including office equipment and point of sales 15/.....	299	(X)	6,493,889	(X) r/	7,929,366
334419D	Electronic components and subassemblies, n.e.c.	534	(X)	6,599,451	(X)	8,331,646
	Antenna systems (except structural towers sold separately):					
334419D108	Home antenna.....	10	19,430	223,923	r/ 30,552 r/	306,914
334419D110	Auto antenna.....	8	(D)	(D)	r/ 17,014 r/	59,226
334419D115	Antenna accessories, sold separately (pedestals, drives, passive reflectors, rotators, radomes, etc.).....	10	(X)	13,949	(X) r/	13,620
334419D220	Delay lines (distributed constant, lumped constant, magnetostrictive, ultrasonic, etc.).....	13	3,366	33,621	7,895	51,661
334419D325	Oscillators (except instrumentation and crystal types).....	21	16,702	234,364	19,053	282,908
3342203051	Magnetic recording and reproducing heads, including audio, video, digital and instrumentation.....	11	(D)	(D)	(D)	(D)

Table 2. Quantity and Value of Shipments of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2001 and 2000
[Quantity in thousands of units. Values in thousands of dollars]

Product code	Product description	No. of cos.	2001		2000	
			Quantity	Value	Quantity	Value
	Static power supply converters for electronic applications, sold separately:					
334419D530	Regulated.....	63	33,420	1,204,582	49,149	1,760,856
334419D535	Other (unregulated, variable frequency, ac, dc, converters and inverters, vibrator, etc.).....	44	(X)	488,257	(X) r/	709,199
334419D640	Electronic cable harnesses and cable assemblies.....	257	(X)	2,288,000	(X) r/	2,719,442
334419D745	Cryogenic cooling devices (cryostats, etc.) for infrared detectors, masers.....	3	(X)	15,372	(X)	14,150
334419D850	Liquid crystal displays (LCD) and other liquid devices.....	15	(X)	49,813	(X)	80,306
334419D955	Magnetic cores.....	14	(X)	180,972	(X) r/	275,335
	Electronic parts, n.e.c. and specialized electronic hardware:					
	Sockets for electronic component insertion:					
334419DA65	Integrated circuit sockets.....	16	(X)	67,456	(X)	143,190
334419DA60	Other, including tube, relay, discrete semiconductors, ac and dc converters and inverters, etc.	18	(X)	45,270	(X) r/	55,174
336322C119	Electronic control modular chips for motor vehicles.....	4	(X)	128,327	(X)	(D)
334419D870	All other electronic parts and specialized electronic hardware, n.e.c.	133	(X)	1,338,910	(X)	1,565,899
	Electronic research, development, testing, and evaluation (receipts or billings, not reported as shipments of specific products):					
99980 42	Systems.....	17	(X)	111,532	(X) r/	118,018
99980 43	Equipment and subassemblies.....	27	(X)	223,403	(X)	241,045
99980 44	Component parts.....	25	(X)	67,711	(X)	155,958
99980 46	Basic scientific electronic research.....	17	(X)	94,507	(X)	74,514
99980 47	Design and engineering services.....	64	(X)	(D)	(X)	486,280
99980 48	Software.....	6	(X)	(D)	(X)	(D)
99980 49	Testing.....	12	(X)	7,824	(X) r/	7,109
99980 50	Supplies and accessories sold with components.....	7	(X)	6,686	(X) r/	15,164

*Similar products are collected on Current Industrial Report series MA335A, "Switchgear and Industrial Controls," and MA335K, "Wiring Devices and Supplies." - Represents zero. D Withheld to avoid disclosing data for individual companies. NA Not available. n.e.c. Not elsewhere r/Revised by 5 percent or more from previously published data. X Not applicable.

1/Product code 3344114010 is combined with product code 3344114015 to avoid disclosing data for individual companies.
2/Product code 3344131015 is combined with product code 3344131021 to avoid disclosing data for individual companies.
3/Product code 3344131068 is combined with product code 3344131070 to avoid disclosing data for individual companies.
4/Product code 3344131082 is combined with product code 3344131084 to avoid disclosing data for individual companies.
5/Product code 3344131092 is combined with product code 3344131094 to avoid disclosing data for individual companies.
6/Product code 3344137025 is combined with product code 3344137005 to avoid disclosing data for individual companies.
7/Product code 3344140331 is combined with product code 3344140333 to avoid disclosing data for individual companies.
8/Product code 3344140769 is combined with product code 3344140772 to avoid disclosing data for individual companies.
9/Product code 3344150208 is combined with product code 3344150212 to avoid disclosing data for individual companies.
10/Product code 3344150344 is combined with product code 3344150348 to avoid disclosing data for individual companies.
11/Product code 3344150468 is combined with product code 3344150469 to avoid disclosing data for individual companies.
12/Product code 3344177010 is combined with product code 3344177015 to avoid disclosing data for individual companies.
13/Product code 3344191255 is combined with product code 3344191260 to avoid disclosing data for individual companies.
14/Product code 3344197005 is combined with product code 3344197010 to avoid disclosing data for individual companies.
15/These data are collected on two Current Industrial Report forms, MA334R, "Computers and Office and Accounting Machines," and MA334Q, "Semiconductors, Printed Circuit Boards, and Other Electronic Components."

Table 3. Shipments, Exports, and Imports of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2001
[Values in Thousands]

Product code	Product description	Manufactures' shipments (value, f.o.b. plant)	Exports of domestic merchandise (value at port) 1/	Imports for consumption 2/
3344111105	High vacuum tubes.....	68,881	51,088	16,815
3344111110	Gas and vapor tubes.....	33,085	6,191	404
3344111115	Klystrons, including amplifier, reflex, and other.....	(D)	40,709	113,268
3344111120	Magnetrons, including pulsed, fixed, tunable, cross-field, continuous wave and other.....	(D)	9,374	28,146
3344111340	Light sensing tubes.....	98,333	57,766	87,019
3344114005	Receiving type electron tubes, including rebuilt.....	(D)	9,359	6,757
3344114010, 015, 020, 025	Television tubes, color and black and white, new and rebuilt.....	(D)	1,775,447	274,345
3344117030	Electron tube parts (except glass blanks).....	97,822	133,101	280,869
3344120105, 210, 315, 420, 425, 430, 432, 433, 435, 440	Printed circuit boards.....	8,944,884	2,088,749	2,205,317
3344131048	Monolithic integrated circuits, digital (except memory and silicon).....	645,380	420,275	70,699
3344131036	Monolithic integrated circuits, digital, memory (except silicon).....	(D)	318,928	197,978
3344131015	Monolithic integrated circuits, digital, silicon, bipolar transistors, memory, static random access memory (SRAM) 3/.....	(D)	32,921	1,354
3344131021	Monolithic integrated circuits, digital, silicon, bipolar transistors, memory (except static random access memory (SRAM)) 3/.....	79,664	15,995	7,265
3344131024	Monolithic integrated circuits, digital, silicon, bipolar transistors (except memory, transistor-transistor logic (TTL)).....	542,191	30,764	37,446
3344131032	Monolithic integrated circuits, digital, silicon, bipolar transistors, including emitter coupled logic (ECL) (except memory, n.e.c.).....	(D)	116,941	208,816
3344131068, 070, 072	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors: With volatile memory (DRAM).....	2,279,770	1,729,138	2,720,124
3344131082, 084, 086	With volatile memory (SRAM).....	1,138,187	1,155,598	1,102,538
3344131092, 094	Except volatile memory, electrically (EEPROM).....	1,069,118	411,807	1,781,672
3344131079	Except volatile memory (except electrically (EEPROM)).....	416,318	164,477	157,690
3344131080	Except volatile memory, n.e.c.	2,995,598	532,471	749,435
3344131054	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors (except memory type): Microprocessors 8 bits or less.....	718,708	17,621	834,353
3344131057	Microprocessors 16 bits.....	1,027,624	45,898	473,491
3344131060	Microprocessors 32 bits or more.....	(D)	1,383,769	3,157,972
3344131033	Other (microcontrollers, ASICs PLAs, etc.).....	6,150,468	1,757,448	6,556,282
3344131039	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors, complementary BiMOS, memory type.....	894,149	20,755	51,306
3344131042	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors, complementary BiMOS (except memory type).....	445,301	123,635	230,870
3344131045	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors, complementary BiMOS, n.e.c., including logic type (except memory types).....	1,708,911	311,664	392,648
3344131062, 003, 006, 009	Monolithic integrated circuits, nondigital, silicon, including linear, analog, radio frequency, etc.....	5,651,188	2,613,118	3,968,102
3344131018, 051	Hybrid integrated circuits.....	1,410,514	668,228	656,416
3344140331	Capacitors, fixed, tantalum electrolytic, metal case, dipped, chips, including foil and wet 4/.....	(D)	101,178	285,361
3344140333	Capacitors, fixed, tantalum electrolytic, n.e.c., including leaded 4/	178,887	62,847	101,353

Table 3. Shipments, Exports, and Imports of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2001
[Values in Thousands]

Product code	Product description	Manufactures' shipments (value, f.o.b. plant)	Exports of domestic merchandise (value at port) 1/	Imports for consumption 2/
3344140436	Capacitors, fixed, aluminum electrolytic, not exceeding 35 mm.....	(D)	53,821	218,809
3344140439, 442, 445	Capacitors, fixed, aluminum electrolytic, over 35 mm.....	(D)	12,730	33,583
3344140550	Capacitors, fixed, ceramic dielectric, single layer.....	16,894	44,633	39,543
3344140555	Capacitors, fixed, ceramic dielectric, multilayer, axial leads and radial leads.....	49,383	99,879	97,456
3344140560	Capacitors, fixed, ceramic dielectric, multilayer, chips.....	593,170	356,257	493,756
3344140663	Capacitors, fixed, mica dielectric	8,478	1,969	2,523
3344140666	Capacitors, fixed, n.e.c.	87,021	294,171	77,034
3344140769	Capacitors, variable, mica/ceramic/glass dielectric 5/.....	(D)	11,209	3,385
3344140772	Capacitors, variable, n.e.c. 5/.....	45,065	52,983	22,263
3344140875	Capacitors, parts, including unfinished chips for further finishing.....	(D)	195,201	42,728
3344140103	Capacitors, fixed, ac type, less than 300 volts.....	28,623	13,033	17,712
3344140106	Capacitors, fixed, ac type, 300-599 volts.....	74,232	982	38,464
3344140109	Capacitors, fixed, ac type, 600-999 volts.....	6,487	231	2,421
3344140112	Capacitors, fixed, ac type, 1,000 volts or more.....	8,920	9,187	1,255
3344140215	Capacitors, fixed, dc type, axial	39,306	590	2,570
3344140218	Capacitors, fixed, dc type, radial	16,644	3,523	53,539
3344140221	Capacitors, fixed, dc type, chips and other leaded.....	(D)	16,696	21,441
3344134005	Transistors, signal, less than 1 watt dissipation.....	50,892	131,321	263,785
3344134010	Transistors, signal, 1 watt or greater dissipation.....	735,020	281,504	802,614
3344137010	Signal diodes and assemblies.....	11,165	17,323	33,907
3344137025	Zener diodes.....	(D)	44,438	76,112
3344137015, 005	Diodes and rectifiers, n.e.c.	(D)	237,802	387,261
3344137020	Microwave diodes.....	137,810	60,858	40,177
334413A005	Solar cell.....	122,069	232,226	118,713
334413A015, 020	Light-emitting diodes.....	(D)	297,066	714,011
334413A030	Optical coupled isolators.....	(D)	51,935	156,624
334413A035	Other light-sensitive and light-emitting devices.....	241,845	280,609	244,131
334413A040	Thyristors, SCR's, triacs, and PNP diodes.....	96,235	44,542	154,911
334413A055	Chips and wafers for integrated circuits.....	3,278,985	16,686,127	2,425,652
334413A060	Chips and wafers for discrete semiconductors.....	270,284	1,366,645	182,206
334413A065	Other semiconductor parts.....	1,342,049	353,957	231,153
3344150104	Carbon resistors, fixed, composition or film types, designed for surface mounting (SMD) by contact, having two terminals, cylindrical leadless having two leads, carbon composition, and carbon film.....	14,751	23,858	23,264
3344150208, 212	Carbon resistors, fixed, with a power capacity of 20 watts or less, surface mounted (SMD), having two terminals, flat resistor chips, and cylindrical leadless resistors.....	81,485	33,450	118,102
3344150216, 220	Carbon resistors, fixed, with a power capacity of 20 watts or less, surface mounted (SMD), having more than two terminals, resistor, resistor-capacitor networks.....	30,495	17,005	17,455
3344150224	Resistors, fixed, with a power capacity of 20 watts or less, wirebound, having two leads.....	62,201	19,435	31,477
3344150228	Resistors, fixed, with a power capacity of 20 watts or less, other than wirebound, having two leads.....	72,329	33,643	56,898
3344150232, 236, 240	Resistors, fixed, with a power capacity of 20 watts or less, resistor networks, having more than two leads.....	89,299	42,919	28,376
3344150468, 469	Resistors, variable, wirewound, including rheostats and potentiometers, for a power handling capacity not exceeding 20 watts.....	21,990	12,893	21,076
3344150344, 348, 359, 576, 580	Resistors, variable, n.e.c.	(D)	239,547	269,067
3344150684	Resistors, parts	114,153	54,640	59,870
3344191225, 230, 235, 240, 245, 250, 255, 260, 265	Piezoelectric devices (except crystal blanks).....	441,219	193,553	457,702
3344191270, 275	Piezoelectric devices, crystal blanks.....	203,319	10,621	8,572
3344160040	Television transformers and reactors.....	118,918	15,479	99,348

Table 3. Shipments, Exports, and Imports of Semiconductors, Printed Circuit Boards, and Other Electronic Components: 2001
[Values in Thousands]

Product code	Product description	Manufactures' shipments (value, f.o.b. plant)	Exports of domestic merchandise (value at port) 1/	Imports for consumption 2/
3344160020, 030, 035, 010, 015, 045, 050	Coils, transformers, reactors, and chokes for electronic applications, n.e.c.	1,045,133	321,934	842,412
3344171000	Connectors coaxial.....	505,240	138,851	186,573
3344174000	Connectors, cylindrical	661,608	31,274	109,503
3344177000	Connectors, rack and panel	350,753	26,625	53,174
334417A000	Connectors, printed circuit	1,064,806	346,874	366,670
334419D108, 110, 115	Antenna systems (except structural towers, sold separately).....	(D)	46,914	51,136
3342203051	Magnetic recording and reproducing heads.....	(D)	9,456	7,921
3344197025	Switches, rotary selector.....	57,942	30,442	13,785
3344197035	Switches, pushbutton.....	66,022	83,549	126,475
3344197020	Switches, slide, including rocker, miniature and subminiature.....	34,510	4,750	20,677
3344197040	Switches, snap-action.....	39,272	16,362	101,432
3344197030, 045, 015, 005, 010, 050, 055	Switches, other.....	(D)	708,035	1,002,622

D Withheld to avoid disclosing data for individual companies. n.e.c. Not specified by kind.

1/Source: Census Bureau report EM 545, U.S. Exports.

2/Source: Census Bureau report IM 145, General imports for Consumption.

3/Manufacturers' shipments for "Monolithic integrated circuits, digital, silicon, bipolar transistors, memory, static random memory (SRAM)" and "Monolithic integrated circuits, digital, silicon, bipolar transistors, memory (except static random access memory (SRAM))" are combined to avoid disclosing data for individual companies.

4/Manufacturers' shipments for "Capacitors, fixed, tantalum electrolytic, metal case, dipped, chips, including foil and wet," and "Capacitors, fixed, tantalum electrolytic, n.e.c., including leaded" are combined to avoid disclosing data for individual companies.

5/Manufacturers' shipments for "Capacitors, variable, mica/ceramic/glass dielectric" and "Capacitors, variable, n.e.c." are combined to avoid disclosing data for individual companies.

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2001

Product code	Product description	Export code	Import code
3344114005	Receiving-type electron tubes.....	8540.81.0000	8540.81.0000
3344114010, 015, 015, 020, 025	Television tubes, color, black and white, new and rebuilt.....	8540.11.0035	8540.11.1030
		8540.11.0070	8540.11.1040
		8540.11.0080	8540.11.1050
		8540.12.0000	8540.11.1055
			8540.11.1065
			8540.11.1080
			8540.11.2401
			8540.11.2801
			8540.11.3000
			8540.11.4401
			8540.11.4801
			8540.11.5000
			8540.12.1040
			8540.12.1080
			8540.12.2001
			8540.12.5040
			8540.12.5080
			8540.12.7000
3344111110	Gas and vapor tubes.....	8540.89.0020	8540.89.0020
3344111115	Klystrons, including amplifiers, reflex, and other.....	8540.72.0000	8540.72.0000
		8540.79.0000	8540.79.0000
3344111120	Magnetrons, including pulsed, fixed, tunable, cross-field, continuous wave and other.....	8540.71.2000	8540.71.2000
		8540.71.4000	8540.71.4000
3344111340	Light-sensing tubes.....	8540.20.2000	8540.20.2040
		8540.20.4000	8540.20.2080
		8540.89.0060	8540.20.4000
			8540.89.0060
3344111105	High vacuum tubes, including triodes, multigrid external and internal anodes, diodes and others.....	8540.89.0040	8540.89.0040
		8540.89.0080	8540.89.0080
3344117030	Electron tube parts (except glass blanks).....	8540.91.2000	8540.91.1500
		8540.91.4000	8540.91.2000
		8540.99.0000	8540.91.5000
			8540.99.8000
3344131036	Monolithic integrated circuits, digital, memory (except silicon).....	8542.13.8092	8542.13.8092
		8542.13.8096	8542.13.8096
3344131048	Monolithic integrated circuits, digital (except memory and silicon).....	8542.13.8010	8542.13.8010
3344131015	Monolithic integrated circuits, digital, silicon, bipolar transistors, memory, SRAM.....	8542.14.8004	8542.14.8004

Continued

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2001

Product code	Product description	Export code	Import code
3344131021	Monolithic integrated circuits, digital, silicon, bipolar transistors, memory (except SRAM).....	8542.14.8007	8542.14.8007
3344131024	Monolithic integrated circuits, digital, silicon, bipolar transistors (except memory, transistor-transistor logic (TTL)).....	8542.14.8011	8542.14.8011
3344131032	Monolithic integrated circuits, digital, silicon, bipolar transistors, including emitter coupled logic (ECL), (except memory, n.e.c.).....	8542.14.8012 8542.14.8017	8542.14.8012 8542.14.8017
3344131068, 070, 072	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors volatile memory, (DRAM).....	8542.13.8012 8542.13.8025	8542.13.8026 8542.13.8029 8542.13.8030 8542.13.8031 8542.13.8032
3344131082, 084, 086	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors volatile memory (SRAM).....	8542.13.8043 8542.13.8044	8542.13.8043 8542.13.8045 8542.13.8049
3344131092, 094	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors (except volatile memory (EEPROM)).....	8542.13.8056	8542.13.8051 8542.13.8052 8542.13.8057
3344131079	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors (except volatile memory (EEPROM)).....	8542.13.8061	8542.13.8058 8542.13.8059 8542.13.8060
3344131080	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors (except volatile memory, n.e.c.).....	8542.13.8065	8542.13.8065
3344131054	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors, (except memory type, including microprocessors having an internal data bus of 8 bits or less).....	8542.13.8066	8542.13.8066
3344131057	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors (except memory type, including microprocessors having an internal data bus of 16 bits).....	8542.13.8067	8542.13.8067

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2001

Product code	Product description	Export code	Import code
3344131060	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors (except memory type, including microprocessors having an internal data bus of 32 bits).....	8542.13.8068	8542.13.8068
3344131033	Monolithic integrated circuits, digital, silicon, metal oxide (MOS) field effect transistors, (except memory type: controllers, application specific integrated circuits and programmable logic arrays (except microprocessors).....	8542.13.8072	8542.13.8072
3344131039	Monolithic integrated circuits, digital, silicon, other than metal oxide (MOS) field effect transistors, complementary BiMOS, memory type.....	8542.19.8073	8542.19.8073
3344131042	Monolithic integrated circuits, digital, silicon, other than metal oxide (MOS) field effect transistors, complementary BiMOS, n.e.c., including logic type (except memory types).....	8542.19.8078	8542.19.8078
3344131045	Monolithic integrated circuits, digital, silicon, other than metal oxide (MOS) field effect transistors, complementary BiMOS, n.e.c., including logic type (except memory types).....	8542.19.8079	8542.19.8079
3344131062, 003, 006, 009	Monolithic integrated circuits, nondigital, inc. linear, analog, radio frequency, etc.....	8542.30.0040	8542.30.0040
		8542.30.0060	8542.30.0060
		8542.30.0065	8542.30.0065
		8542.30.0080	8542.30.0080
		8542.30.0090	8542.30.0090
3344131018, 051	Hybrid integrated circuits.....	8542.40.0075	8542.40.0075
		8542.40.0095	8542.40.0095
3344140331	Capacitors, fixed, tantalum electrolytic, metal case, including foil and wet, dipped and chips.....	8532.21.0020	8532.21.0020
		8532.21.0040	8532.21.0040
		8532.21.0050	8532.21.0050
3344140333	Capacitors, fixed, tantalum electrolytic, n.e.c., including leaded (molded axial and molded radial).....	8532.21.0080	8532.21.0080
3344140436	Capacitors, fixed, aluminum electrolytic, not exceeding 35 mm.....	8532.22.0020	8532.22.0020
		8532.22.0040	8532.22.0040
3344140439, 442, 445	Capacitors, fixed, aluminum electrolytic, over 35 mm.....	8532.22.0055	8532.22.0055
		8532.22.0085	8532.22.0085

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2001

Product code	Product description	Export code	Import code
3344140550	Capacitors, fixed, ceramic dielectric, single layer.....	8532.23.0020 8532.23.0040 8532.23.0060	8532.23.0020 8532.23.0040 8532.23.0060
3344140555	Capacitors, fixed, ceramic dielectric, multilayer axial leads and radial leads.....	8532.24.0040 8532.24.0060	8532.24.0040 8532.24.0060
3344140560	Capacitors, fixed, ceramic dielectric, multilayer chips.....	8532.24.0020	8532.24.0020
3344140663	Capacitors, fixed, mica dielectric.....	8532.29.0020	8532.29.0020
3344140666	Capacitors, fixed, n.e.c.	8532.29.0040	8532.29.0040
3344140769	Capacitors, variable, mica/ceramic/glass dielectric.....	8532.30.0010	8532.30.0010
3344140772	Capacitors, variable, n.e.c.	8532.30.0090	8532.30.0090
3344140875	Capacitors, parts, including unfinished chips for further finishing and assembly.....	8532.90.0000	8532.90.0000
3344140103	Capacitors, fixed, paper, plastic(film), metalized, and dual film/paper dielectric, ac types, less than 300 volts.....	8532.25.0010	8532.25.0010
3344140106	Capacitors, fixed, paper, plastic(film), metalized, and dual film/paper dielectric, ac types, 300 volts to 599 volts.....	8532.25.0020	8532.25.0020
3344140109	Capacitors, fixed, paper, plastic(film), metalized, and dual film/paper dielectric, ac types, 600 volts to 999 volts.....	8532.25.0030	8532.25.0030
3344140112	Capacitors fixed, paper, plastic(film), metalized, and dual film/paper dielectric, ac types, 1000 volts or over.....	8532.25.0040	8532.25.0040
3344140215	Capacitors, fixed, paper, plastic(film), metalized, and dual film/paper dielectric, dc types, axial lead.....	8532.25.0060	8532.25.0060
3344140218	Capacitors, fixed, paper, plastic(film), metalized, and dual film/paper dielectric, dc types, radial lead.....	8532.25.0070	8532.25.0070
3344140221	Capacitors, fixed, paper, plastic(film), metalized, and dual film/paper dielectric, dc types, chips and other leaded devices.....	8532.25.0050 8532.25.0080	8532.25.0080
3344134005	Transistors, signal, less than 1 watt dissipation.....	8541.21.0080	8541.21.0075 8541.21.0095

Continued

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2001

Product code	Product description	Export code	Import code
3344134010	Transistors, power, 1 watt or greater dissipation.....	8541.29.0080	8541.29.0075 8541.29.0095
3344137025	Zener diodes.....	8541.10.0050	8541.10.0050
3344137020	Microwave diodes.....	8541.10.0060	8541.10.0060
3344137010	Signal diodes and assemblies.....	8541.10.0070	8541.10.0070
3344137015, 005	Diodes and rectifiers, n.e.c.	8541.10.0080	8541.10.0080
334413A005	Solar cell.....	8541.40.6020 8541.40.6030	8541.40.6020 8541.40.6030
334413A015, 020	Light-emitting diodes.....	8541.40.2000	8541.40.2000
334413A030	Optical coupled isolators, including sensors and emitters.....	8541.40.8000	8541.40.8000
334413A040	Thyristors, SCR's, triacs, and PNP diodes.....	8541.30.0080	8541.30.0080
334413A035	Other light-sensitive and light-emitting devices.....	8541.40.7080 8541.40.9500	8541.40.7080 8541.40.9500
334413A060	Chips and wafers for discrete semiconductors.....	8541.10.0040 8541.21.0040 8541.29.0040 8541.30.0040 8541.40.6010 8541.40.7040 8541.50.0040 8541.50.0080	8541.10.0040 8541.21.0040 8541.29.0040 8541.30.0040 8541.40.6010 8541.40.7040 8541.50.0040 8541.50.0080
334413A055	Chips and wafers for integrated circuits.....	8542.13.8005 8542.13.8010 8542.14.8001 8542.14.8002 8542.19.8001 8542.19.8002 8542.30.0040	8542.13.8005 8542.13.8010 8542.14.8001 8542.14.8002 8542.19.8001 8542.19.8002 8542.30.0040
334413A065	Semiconductor parts, n.e.c., including headers, packages, heat sinks, accessories, etc.	8541.90.0000	8541.90.0000
3344150104	Resistors, fixed, carbon, composition or film types, designed for surface mounting (SMD) by contact, having two terminals, cylindrical leadless having two leads, carbon composition, and carbon film.....	8533.10.0042 8533.10.0070	8533.10.0042 8533.10.0060 8533.10.0065

Continued

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2001

Product code	Product description	Export code	Import code
3344150208, 212	Resistors, fixed, with a power capacity of 20 watts or less, surface mounted (SMD), having two terminals, including bith flat resistor chips, and cylindrical leadless resistors.....	8533.21.0045	8533.21.0030 8533.21.0040
3344150216, 220	Resistors, fixed, with a power capacity of 20 watts or less, surface mounted (SMD), having more than two terminals: resistor, resistor-capacitor networks.....	8533.21.0025	8533.21.0010 8533.21.0020
3344150224	Resistors, fixeds, with a power capacity of 20 watts or less, wirewound, having two leads.....	8533.21.0080	8533.21.0080
3344150228	Resistors, fixed, with a power capacity of 20 watts or less, other than wirewound, having two leads.....	8533.21.0090	8533.21.0090
3344150232, 236, 240	Resistors, fixed, with a power capacity of 20 watts or less: resistor networks, having more than two leads.	8533.10.0020 8533.10.0057 8533.21.0075	8533.10.0020 8533.10.0057 8533.21.0050 8533.21.0060 8533.21.0070
3344150468, 469	Resistors, variable, wirewound, including rheostats and potentiometers, for a power handling capacity not exceeding 20 watts.....	8533.31.0000	8533.31.0000
3344150344, 348, 359, 579, 580	Resistors, variable, n.e.c.	8533.40.0080	8533.40.8050 8533.40.8060 8533.40.8070
3344150684	Resistors, parts	8533.90.0000	8533.90.4000 8533.90.8000
3344191225, 230, 235, 240, 245, 250, 255, 260, 265	Piezoelectric devices (except crystal blanks).....	8541.60.0025 8541.60.0060 8541.60.0080	8541.60.0010 8541.60.0020 8541.60.0030 8541.60.0050 8541.60.0060 8541.60.0080
3344191270, 275	Piezoelectric devices, crystal blanks.....	7104.10.0000	7104.10.0000
3344120105, 210, 315, 420, 425, 430, 432, 433, 435, 440	Printed circuit boards.....	8534.00.0020 8534.00.0040 8534.00.0050 8534.00.0070 8534.00.0080 8534.00.0085 8534.00.0095	8534.00.0020 8534.00.0040 8534.00.0050 8534.00.0070 8534.00.0080 8534.00.0085 8534.00.0095

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2001

Product code	Product description	Export code	Import code
3344160040	Television transformers and reactors (horizontal) output, vertical deflection, focus coils, deflection yokes, etc.	8529.90.3540 8540.91.2000	8529.90.3600 8540.91.2000
3344160020, 030, 035, 010, 015, 045, 050	Coils, transformers, reactors, and chokes for electronic applications, n.e.c.	8504.31.2000 8504.31.4035 8504.31.4065 8504.31.6000 8504.32.0000 8504.33.0020 8504.33.0040 8504.34.0000	8504.31.2000 8504.31.4035 8504.31.4065 8504.31.6000 8504.32.0000 8504.33.0020 8504.33.0040 8504.34.0000
3344171000	Connectors, coaxial	8536.69.4010	8536.69.4010
3344174000	Connectors, cylindrical	8536.69.4020	8536.69.4020
3344177000	Connectors, rack and panel	8536.69.4030	8536.69.4030
334417A000	Connectors, printed circuit	8536.69.4040	8536.69.4040
334419D108, 110, 115	Antenna systems (except structural towers sold separately).....	8529.10.2020	8529.10.2020
3342203051	Magnetic recording and reproducing heads, including audio, video, digital and instrumentation.....	8522.90.0010	8522.90.5540 8522.90.7540
3344197025	Rotary selector switches for electronic circuitry, including lever and jog-levers, miniature and subminiature.....	8536.50.9020 8536.50.9025	8536.50.9020
3344197035	Pushbutton switches for electronic circuitry.....	8536.50.9030 8536.50.9035	8536.50.9031 8536.50.9032 8536.50.9033 8536.50.9035
3344197020	Slide switches, including rocker for electronic circuitry, both miniature and subminiature.....	8536.50.9050**	8536.50.9050**
3344197040	Snap-action switches for electronic circuitry.....	8536.50.9040**	8536.50.7000** 8536.50.9040**
3344197030, 045, 015, 005, 010, 050, 055	Switches for electronic circuitry, n.e.c.....	8536.50.9045** 8536.50.9055 8536.50.9065	8536.50.9055 8536.50.9065

** HS codes include switches of product class 36433. n.e.c. Not elsewhere classified.

Appendix.

General CIR Survey Information, Explanation of General Terms and Historical Note

GENERAL

The CIR program has been providing monthly, quarterly, and annual measures of industrial activity for many years. Since 1904, with its cotton and fats and oils surveys, the CIR program has formed an essential part of an integrated statistical system involving the quinquennial economic census, manufacturing sector, and the annual survey of manufactures. The CIR surveys, however, provide current statistics at a more detailed product level than either of the other two statistical programs.

The primary objective of the CIR program is to produce timely, accurate data on production and shipments of selected products. The data are used to satisfy economic policy needs and for market analysis, forecasting, and decision making in the private sector. The product-level data generated by these surveys are used extensively by individual firms, trade associations, and market analysts in planning or recommending marketing and legislative strategies, particularly if their industry is significantly affected by foreign trade. Although production and shipments information are the two most common data items collected, the CIR program collects other measures also such as inventories, orders, and consumption. These surveys measure manufacturing activity in important commodity areas such as textiles and apparel, chemicals, primary metals, computer and electronic components, industrial equipment, aerospace equipment, and consumer goods.

The CIR program uses a unified data collection, processing, and publication system. The U.S. Census Bureau updates the survey panels for most reports annually and reconciles the estimates to the results of the broader-based annual survey of manufactures and the economic census, manufacturing sector. The manufacturing sector provides a complete list of all producers of the products covered by the CIR program and serves as the primary source for CIR sampling. Where a small number of producers exist, CIR surveys cover all known producers of a product. However, when the number of producers is too large, cutoff and random sampling techniques are used. Surveys are continually reviewed and modified to provide the most up-to-date information on products produced. The CIR program includes a group of mandatory and voluntary surveys. Typically the monthly and quarterly surveys are conducted on a voluntary basis. Those companies that choose not to respond to the voluntary surveys are required to submit a mandatory annual counterpart corresponding to the more frequent survey.

NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS), 1997

The adoption of the North American Industry Classification System (NAICS) in the 1997 Economic Census has had a major impact on the comparability of current and historic data. Approximately half of the industries in the manufacturing sector of NAICS do not have comparable industries in the Standard Industrial Classification (SIC) system that was used in the past.

While most of the change affecting the manufacturing sector was change within the sector, some industries left manufacturing and others came into manufacturing. Prominent among those that left manufacturing are logging and portions of publishing. Prominent among the industries that came into the manufacturing sector are bakeries, candy stores where candy is made on the premises, custom tailors, makers of custom draperies, and tire retreading. The net effect of the classification changes are such that if the 1997 value of shipments data for all manufacturers were tabulated on an SIC basis, it would be approximately 3 percent higher.

Listed below are the NAICS sectors:

- 21 Mining
- 22 Utilities
- 23 Construction
- 31-33 Manufacturing
- 42 Wholesale Trade
- 44-45 Retail Trade
- 48-49 Transportation and Warehousing
- 51 Information
- 52 Finance and Insurance
- 53 Real Estate and Rental and Leasing
- 54 Professional, Scientific, and Technical Services
- 55 Management of Companies and Enterprises
- 56 Administrative and Support and Waste Management and Remediation Services
- 61 Educational Services
- 62 Health Care and Social Assistance
- 71 Arts, Entertainment, and Recreation
- 72 Accommodation and Food Services
- 81 Other Services (except Public Administration)

(Not listed above are the Agriculture, Forestry, Fishing, and Hunting sector (NAICS 11), partially covered by the census of agriculture conducted by the U.S. Department of Agriculture, and the Public Administration sector (NAICS 92), covered by the census of governments conducted by the Census Bureau.)

The 20 NAICS sectors are subdivided into 96 subsectors (three-digit codes), 313 industry groups (four-digit codes), and, as implemented in the United States, 1170 industries (five- and six-digit codes).

FUNDING

The Census Bureau funds most of the surveys. However, a number of surveys are paid for either fully or partially by other Federal Government agencies or private trade associations. A few surveys are mandated, but all are authorized by Title 13 of the United States Code.

RELIABILITY OF DATA

Survey error may result from several sources including the inability to obtain information about all cases in the survey, response errors, definitional difficulties, differences in the interpretation of questions, mistakes in recording or coding the reported data, and other errors of collection, response, coverage, and estimation. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to these nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is the imputing of data for nonrespondents, for late reporters, and for data that fail logic edits. Missing figures are imputed based on period-to-period movements shown by reporting firms. A figure is considered to be an impute if the value was not directly reported on the questionnaire, directly derived from other reported items, directly available from supplemental sources, or obtained from the respondent during the analytical review phase. Imputation generally is limited to a maximum of 10 percent for any one data cell. Figures with imputation rates greater than 10 percent are suppressed or footnoted. The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 10 percent should be used with caution.

DATA REVISIONS

Statistics for previous years may be revised as the result of corrected figures from respondents, late reports for which imputations were originally made, or other corrections. Data that have been revised by more than 5 percent from previously published data are indicated by footnotes.

DISCLOSURE

The Census Bureau collects the CIR data under the authority of Title 13, United States Code, which specifies that the information can only be used for statistical purposes and cannot be published or released in any manner that would identify a person, household, or establishment. "D" indicates that data in the cell have been suppressed to avoid disclosure of information pertaining to individual companies.

EXPLANATION OF GENERAL TERMS

Capacity. The maximum quantity of a product that can be produced in a plant in 1 day if operating for 24 hours. Includes the capacity of idle plants until the plant is reported to be destroyed, dismantled, or abandoned.

Consumption. Materials used in producing or processing a product or otherwise removing the product from the inventory.

Exports. Includes all types of products shipped to foreign countries, or to agents or exporters for reshipment to foreign countries.

Gross shipments. The quantity or value of physical shipments from domestic establishments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale or use. Shipments of products purchased for resale are omitted. Shipments of products made under toll arrangements are included.

Interplant transfers. Shipments to other domestic plants within a company for further assembly, fabrication, or manufacture.

Inventories. The quantity or value of finished goods, work in progress, and materials on hand.

Machinery in place. The number of machines of a particular type in place as of a particular date whether the machinery was used for production, prototype, or sampling, or was idle. Machinery in place includes all machinery set up in operating positions.

Net receipts. Derived by subtracting the materials held at the end of the previous month from the sum of materials used during the current month.

Production. The total volume of products produced, including: products sold; products transferred or added to inventory after adjustments for breakage, shrinkage, and obsolescence, plus any other inventory adjustment; and products that undergo further manufacture at the same establishment.

Quantities produced and consumed. Quantities of each type of product produced by a company for internal consumption within that same company.

Quantity and value of new orders. The sales value of orders received during the current reporting period for products and services to be delivered immediately or at some future date. Also represents the net sales value of contract change documents that increase or decrease the sales value of the orders to which they are related, when the parties concerned are in substantial agreement as to the amount involved. Included as orders are only those that are supported by binding legal documents such as signed contracts or letter contracts.

Quantity and value of shipments. The figures on quantity and value of shipments represent physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and returns. Shipments to a company's own branches are assigned the same value as comparable appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

Stocks. Total quantity of ending finished inventory.

Unfilled orders (backlog). Calculated by adding net new orders and subtracting net sales from the backlog at the end of the preceding year.

HISTORICAL NOTE

Data on selected electronic and associated products have been collected by the Census Bureau since 1961 on survey MA36N, Selected Electronics and Associated Products. In 1985, survey MA36N was divided into three annual surveys which are presently collected as: MA334P, Communication Equipment, Including Telephone, Telegraph, and Other Electronic Systems and Equipment; MA334Q, Semiconductors, Printed Circuit Boards, and Other Electronic Components; and MA334S, Electromedical Equipment and Irradiation Equipment (Including X-Ray). Historical data may be obtained from Current Industrial Reports available at your local Federal Depository Library.